

## **REMARKS**

Reconsideration of this application, based on this amendment and these following remarks, is respectfully requested.

Claims 1 through 3, 5, 6, 8 through 15, 17, 18, and 20 through 26 remain in this case. Claims 1, 5, 9, 10, 13, 17, 21, 22, and 25 are proposed to be amended. Claims 4, 7, 16, and 19 were previously canceled.

The remaining claims in this case were all finally rejected under §112, ¶1 as failing to comply with the written description requirement, due to several terms in the specification that were found to not be “well described and/or defined”.<sup>1</sup>

The Examiner again found the passage “a nucleophile of the same general class”<sup>2</sup> to be unclear, as not descriptive of what species would fit into such classes. Applicant proposes amending the specification to cancel the objectionable language from the Summary of the Invention. No new matter is presented by this amendment. Applicant therefore respectfully submits that this amendment of the specification, as proposed, will overcome the §112, ¶1 rejection on this basis; entry of this amendment to the specification is respectfully requested.

The Examiner also finally rejected the claims as lacking sufficient written description rejection because the phrase “ternary or [m]ore complicated compounds and their oxides”<sup>3</sup> was unclear, in that the phrase “ternary or more complicated” was unclear, and that the specification was unclear regarding whether the oxides were of any of the listed species or only of the more complicated compounds.

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<sup>1</sup> Office Action of February 2, 2006, page 3.

<sup>2</sup> Specification, *supra*, page 5, lines 7 and 8.

<sup>3</sup> Specification, *supra*, page 7, lines 29 and 30.

Applicant again maintains that the meaning of this objectionable phrase would be clear to the skilled reader, considering the context of that phrase in its full sentence at that location of the specification. The sentence containing the objectionable phrase reads:

In a specific embodiment, A may be any metal, semimetal, transition metal, or ceramic species including but not limited to Si, Zr, Hf, Nb, Ti, Ta, Cu, Ag, and Al, binary compounds such as GaAs or InP, ternary or [m]ore complicated compounds, and their oxides.<sup>4</sup>

Considering the full context of the sentence, it is clear that the term “ternary” refers to a compound of three constituent elements. The construction of this sentence clearly organizes the alternative choices for reagent “A” in the order of complexity: first, reagent “A” is specified a single atomic species (namely “metal, semimetal, transition metal, or ceramic species including but not limited to Si, Zr, Hf, Nb, Ti, Ta, Cu, Ag, and Al”), then examples of reagent “A” as a binary compound (namely GaAs or InP”) are listed, followed by the phrase “ternary or more complicated compounds”. The arrangement of the phrase “ternary or more complicated compounds”<sup>5</sup> also clearly relates the phrase “more complicated” to the binary-ternary sequence. Applicant therefore respectfully submits that, based on the context of the sentence, that the phrase “more complicated” compounds clearly refers to compounds of more than three constituent elements, and that the skilled reader would recognize this context and thus understand the meaning of the phrase “more complicated compounds”.

Regarding the objection to the phrase “and their oxides” as unclear, Applicant submits that the punctuation in this sentence establishes to what “their oxides” refers. As previously urged and as shown in the sentence itself, a comma is present directly before the phrase “and their oxides”.<sup>6</sup> As such, the oxides may be oxides of any of the elemental metallic or ceramic species, or the binary or more complicated compounds. Applicant therefore respectfully submits that this passage of the specification would be clear to the skilled reader who has a working familiarity with the proper use of punctuation in the English language.

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<sup>4</sup> Specification, *supra*, page 7, lines 26 through 30.

<sup>5</sup> As opposed to the possible arrangement of “ternary compounds, more complicated compounds”.

<sup>6</sup> Specification, *supra*, page 7, lines 26 through 30.

Reconsideration of the rejection of the claims under §112, ¶1, and of the objection to the specification, in connection with the phrase “ternary and more complicated compounds, and their oxides”, is respectfully requested.

The Examiner has maintained the rejection and objection to passages of the specification<sup>7</sup> that contain the parameters  $n$ ,  $m$ , and  $D$ , which the Examiner found to be undefined. Applicant maintains his traverse of this basis of the rejection. It is well-known in the art to use variable name parameters, such as  $n$  and  $m$ ,<sup>8</sup> to indicate the number of atoms of a constituent element that are present in a molecule of a compound in cases in which the actual stoichiometry is not known or is unimportant. The skilled reader will also realize, from the context of the use of these parameters in the specification, that the particular values of parameters  $n$  and  $m$  are not important to understanding this invention, but will depend on the particular species. Similarly, the parameter  $D$  clearly refers to a constituent of a compound to which the  $R^2$  species is bound, such that the  $R^2$  species can then react with and displace the reactive species  $X$ , as discussed above. The  $D$  constituent does not participate in the reaction, as is evident from the specification, and as such its particular identity is unimportant, in the context of the invention as described in that location of the specification; the presence of some constituent  $D$  is useful to the reader, however, because it indicates that the compound  $DR^2$  is indeed a compound. Accordingly, Applicant submits that one skilled in the art having reference to this specification would clearly understand the meaning of the parameters  $n$ ,  $m$ , and  $D$ , and respectfully traverses this basis of the rejection.

The Examiner again found that it was unclear whether the “O” characters above the surface in the Figures are oxygen atoms, and if so, how the oxygen atoms are attached to the surface. Applicant again traverses this basis of the rejection. It is readily apparent from the description<sup>9</sup> that the original surface being treated is an oxidized surface. The “O” characters thus clearly refer to the oxygen atoms within such oxide compounds (*i.e.*, the “oxidized” substance). And Applicant respectfully submits that the manner in which oxygen atoms are “attached” in molecules of an oxide compound is a fundamental concept, known by those having

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<sup>7</sup> Specification, *supra*, page 7, lines 18 through 21; page 9, lines 6 and 7; page 20, lines 6 through 8.

<sup>8</sup> Or, alternatively,  $x$  and  $y$ .

<sup>9</sup> Specification, *supra*, page 7, lines 16 through 20.

the slightest training in chemistry. Applicant therefore respectfully submits that the Figures are not unclear in this regard, and traverses the rejection on this basis.

The Examiner again rejected the claims under §112, ¶1 because passages in the specification<sup>10</sup> referring to “oxide surfaces” were unclear because it was ambiguous whether such “oxide surfaces” were the same or different from a later reference to a surface that was “oxidized”.<sup>11</sup> Applicant traverses this basis of the rejection. The undersigned cannot understand how there can be any confusion about the synonymous nature of these two phrases.<sup>12</sup> The context of the passages on page 5 especially indicates that these two phrases mean one and the same thing. Applicant therefore respectfully submits that the skilled reader would not be confused by the synonymous use of these two phrases, and respectfully traverses the rejection accordingly.

Another basis for the §112, ¶1 rejection was that the phrase “form a new exposed surface”<sup>13</sup> was unclear. To advance the prosecution of this application, the proposed amendment to the specification strikes this phrase from the Summary of the Invention. Claims 1, 13, and 24 are also amended accordingly, to strike the phrase “an exposed surface”. No new matter is presented by this proposed amendment, and Applicant submits that entry of that amendment will be sufficient to overcome the rejection made on this basis.

And the final basis for the §112, ¶1 rejection was that the Examiner found it unclear how the coating can be considered a monolayer<sup>14</sup> when two separate species, namely the original active species and also the nucleophilic molecule, build the coating in two steps. Applicant respectfully traverses this basis of the rejection, on the grounds that the specification clearly teaches that the nucleophilic molecule “reacts with and displaces the exposed reactive groups”,<sup>15</sup>

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<sup>10</sup> Specification, *supra*, page 1, line 7; page 5, line 6.

<sup>11</sup> Specification, *supra*, page 5, line 3.

<sup>12</sup> See also specification, *supra*, page 2, lines 3 through 6.

<sup>13</sup> Specification, *supra*, page 5, line 7.

<sup>14</sup> Specification, *supra*, page 10, line 18 through page 11, line 18.

<sup>15</sup> Specification, *supra*, page 7, lines 22 through 25.

to which the cited objectionable passage clearly refers.<sup>16</sup> In effect, the layer formed by the first reacting step (including the compound having a reactive group) is the same layer as that formed by the second reacting step, except that the reactive group constituent of the compound is displaced by another constituent. Applicant respectfully submits that the specification is clear regarding the formation of the monolayer in these two steps, because the second step displaces one species in a layer with another, within that same layer, and accordingly respectfully traverses this basis of the rejection.

For the foregoing reasons, Applicant submits that the claims in this case are fully supported by a written description, within the requirements of §112, ¶1.

Claims 10 and 22 were also rejected under §112, ¶1, as not complying with the written description requirement because the phrase “temperature to which the coating is expected to be exposed in later processing”, added by amendment, was found to be new matter. Without acquiescing in the rejection, Applicant proposes amending claims 10 and 22 to now include a step of exposing the coating to a first temperature, and by limiting the step of forming the coating to performing the reacting at a second temperature that is above that first temperature. The specification of this case, properly interpreted, clearly supports this amendment to claims 10 and 22,<sup>17</sup> and as such no new matter is presented by this amendment. Applicant therefore submits that, upon entry of this amendment, claims 10 and 22 will be adequately supported by the written description.

The claims remaining in this application were all also finally rejected under §112, ¶2 as indefinite for failing to particularly point out and distinctly claim the subject matter of the invention.

Claims 1, 13, and 25 were all specifically rejected because the phrase “to form a new exposed surface” was unclear. To advance the prosecution of this case, each of claims 1, 13, and 25 are proposed to be amended to cancel the objectionable phrase, replacing it in each case with

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<sup>16</sup> Specification, *supra*, page 11, lines 2 and 3 (“*After the reaction*, a single monolayer results . . . .”, *emphasis added*).

“to form a compound”. Applicant submits that the amendment presented to claims 1, 13, and 25 is in no way narrowing.<sup>18</sup> Applicant respectfully submits that, upon entry of this amendment, amended claims 1, 13, and 25 and their dependent claims are sufficiently definite to the skilled reader, in this regard, to meet the requirements of §112, ¶2.

Claims 1, 13, and 25 were further rejected under §112 as indefinite because of the inclusion of the placeholder D, which was found to not be defined. To advance the prosecution of this case, each of claims 1, 13, and 25 are amended to cancel the placeholder “D” therefrom, obviating the basis of rejection. Applicant respectfully submits that amended claims 1, 13, and 25 are sufficiently definite to meet the requirements of §112, ¶2, on this basis.

Claims 5 and 17 were rejected under §112, ¶2 as indefinite because it is unclear, to the Examiner, as to how the coating can be considered a monolayer. As discussed above relative to the §112, ¶1 rejection, the specification clearly teaches that the nucleophilic molecule “reacts with and displaces the exposed reactive groups”.<sup>19</sup> Claims 5 and 17 are also proposed to be amended to recite that the reacting step displaces the reactive group from the compound formed of the reagent “A” and the oxidized surface.<sup>20</sup> Therefore, the second reacting step of claims 5 and 17 (presented in their respective independent claims 1 and 13) does not form a second layer but rather provides the constituent that displaces the reactive group within the original layer. Applicant therefore respectfully submits that proposed amended claims 5 and 7 are now even less unclear than before, and respectfully submits that they meet the requirements of §112, ¶2.

Claims 9 and 21 were rejected under §112, ¶2 because the “such as” phrase rendered the claims indefinite. To advance the prosecution of this case, claims 9 and 21 are proposed to be amended to strike the objectionable phrase.

Claims 10 and 22 were rejected under §112, ¶2 as indefinite because it is unclear what was meant by “later processing”. As discussed above, claims 10 and 22 are each amended to

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<sup>17</sup> Specification, *supra*, page 8, lines 21 through 31.

<sup>18</sup> See *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.*, 535 U.S. 722, 62 USPQ2d 1705 (2002), *on remand*, 304 F.3d 1289, 64 USPQ2d 1698 (Fed. Cir. 2002).

<sup>19</sup> Specification, *supra*, page 7, lines 22 through 25.

overcome the rejection to now include a step of exposing the coating to a first temperature, and by limiting the step of forming the coating to performing the reacting at a second temperature that is above that first temperature. The specification of this case, properly interpreted, clearly supports this amendment to claims 10 and 22,<sup>21</sup> and as such no new matter is presented by this amendment. Applicant submits that proposed amended claims 10 and 22 are now in sufficiently definite form to meet the requirements of §112, ¶2.

Claims 1 through 3, 5, 6, 8 through 15, 17, 18, and 20 through 26 were finally rejected under §102 as anticipated by the Ogawa et al. reference.<sup>22</sup> The Examiner again asserted that the reference teaches the applying of TEOS or other alkoxysilanes to substrates such as glass, metal and ceramics,<sup>23</sup> and that the trimethoxy groups inherently hydrolyze to an alcohol, and react with the TEOS on the substrate to form a water repellent fluorine-containing coating.<sup>24</sup> In response to the previous arguments of Applicant, the Examiner asserts that the Figures and paragraph [0146] of the reference show that the disclosed reaction of the silane compound with the TEOS coating forms a new film, rather than two independent films.<sup>25</sup>

Applicant respectfully submits that proposed amended claims 1, 13, and 25 are novel and patentably distinct over the Ogawa et al. reference, because the reference does not meet the requirements of the claims.

As previously argued, Applicant submits that the Ogawa et al. reference nowhere discloses the reacting of a nucleophilic molecule with a reactive group at an exposed surface following the first reacting step, to form a bond between the nucleophilic molecule and constituent A of the active species. Referring to the location of the reference cited by the Examiner as teaching the second reacting step,<sup>26</sup> it is apparent that there is no reacting of the fluoroalkyl trimethoxy silane compound with a reactive group then at the surface, so that a

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<sup>20</sup> See specification, *supra*, page 7, lines 16 through 25, for support for this proposed amendment.

<sup>21</sup> Specification, *supra*, page 8, lines 21 through 31.

<sup>22</sup> U.S. Patent Publication No. 2001/0031364, published October 18, 2001, on an application by Ogawa et al. filed March 29, 2001.

<sup>23</sup> Ogawa et al, *supra*, paragraphs [0082] and [0084].

<sup>24</sup> *Id.*, paragraphs [0136] and [0153].

<sup>25</sup> Office Action, *supra*, page 8.

nucleophilic molecule in this compound forms a bond with a constituent A at the surface. A full reading of paragraphs [0145] and [0146], within the context of the reference, clearly indicates that the fluoroalkyl trimethoxy silane compound is applied in a methanol solvent, and after evaporation of that solvent, forms a “coating film made of a fluoroalkyl trimethoxy silane compound”.<sup>27</sup> In other words, the Ogawa et al. reference teaches that a second film is formed over a first film.<sup>28</sup> Indeed, claim 30 of the Ogawa et al. reference clearly refers to the structure of a fluorine-containing coating film, and a silica-based coating film interposed between the substrate and the fluorine-containing coating film.<sup>29</sup>

Applicant further respectfully submits that the characterization of the Ogawa et al. reference presented by the Examiner, in response to Applicant’s previous arguments, is belied by the reference itself. The Examiner asserts that paragraph [0146] and Figure 5 indicate that Ogawa et al. teach forming one film, rather than two independent films. To the extent that Figure 5 relates to paragraph [0146],<sup>30</sup> Figure 5 clearly shows two films: silica-based coating film 12, and fluorine-containing coating film 13.<sup>31</sup> It is not clear to the undersigned how the molecular-level diagram of Figure 5 would more clearly show two films that are bonded together that it does in its current form. In addition, paragraph [0146] of Ogawa et al. also clearly refers to two films: the “first layer of silica-based coating film”, and “a coating film of a fluoroalkyl trimethoxy silane compound”.<sup>32</sup> It is especially instructive, in this regard, that the reference describes this process as applying a fluoroalkyl trimethoxy silane compound to the substrate “provided with the first layer of silica-based coating film”, with the result (after dealcoholization) being “a coating film of a fluoroalkyl trimethoxy silane compound”.<sup>33</sup> These two films are clearly two films. The Examiner’s point regarding Ogawa et al. is thus misplaced.

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<sup>26</sup> *Id.*, paragraph [0145].

<sup>27</sup> *Id.*, paragraph [0146].

<sup>28</sup> *See also* Ogawa et al., *supra*, paragraph [0079].

<sup>29</sup> *Id.*, claim 30.

<sup>30</sup> Which it may not, relating instead to paragraph [0149] *et seq.*

<sup>31</sup> Ogawa et al., *supra*, paragraph [0150].

<sup>32</sup> Ogawa et al., *supra*, paragraph [0146].

<sup>33</sup> *Id.*



Therefore, because each of the claims in this case require the forming of a coating by reacting a nucleophilic molecule, having an organic substituent not reactive with active group X, with a reactive group in a previously formed compound to form a bond between the nucleophilic molecule and A or Si, Applicant respectfully submits that the Ogawa et al. reference falls short of the requirements of independent claims 1, 13, and 25. Applicant therefore submits that all of the claims in this case are therefore novel over the Ogawa et al. reference.

The Examiner also finally rejected each of the remaining claims in this case under §102 as anticipated by the Europe ‘740 reference.<sup>34</sup> The Examiner asserted that the reference teaches the applying of TEOS or other alkoxysilanes to substrates, followed by the application of a fluoroalkyl trimethoxysilane.<sup>35</sup> The Examiner further asserted that the trimethoxy groups inherently hydrolyze to an alcohol, and that the heating of the coating also meets the limitations of claims 10 and 22. And in response to Applicant’s previous argument that Figure 1b of the reference does not show bonds, the Examiner asserted that Figure 1c of the reference “shows these bonds”.<sup>36</sup>

Applicant again respectfully submits that the claims in this case are novel over Europe ‘740. As in the case of the Ogawa et al. reference, the Examiner does not assert that the reference teaches, and the reference in fact does not teach, the reacting of a nucleophilic molecule, having an organic substituent, with a reactive group to form a bond between the nucleophilic molecule and a constituent A (claims 1 and 13) or Si (claims 25 and 26). As in the case of the Ogawa et al. reference, this reference also discloses the applying of a second coating over a first film, with no disclosed reacting between the alleged nucleophilic molecule and a constituent A (*e.g.*, Si) from the first reacting. The absence of this reacting is especially evident from Figure 1 of Europe ‘740, in which the second coating step (b) adds an additional layer including silicon atoms, with no illustrated bond between any alleged nucleophilic molecule and an underlying silicon atom, for example, from the first coating step (a). And Figure 1 also shows

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<sup>34</sup> European Patent Publication EP 1 153 740 A1, published November 14, 2001.

<sup>35</sup> ‘740, *supra*, paragraphs [0089], [0104], [0130].

<sup>36</sup> Office Action, *supra*, page 9.

that process step (c) merely “polymerizes” the component of the underlying layer<sup>37</sup> – no reacting as required by the claims is taught by this Figure 1c). Accordingly, Applicant again submits that the teachings of Europe ‘740 fall short of the requirements of each of the claims in this case, as proposed to be amended.

For these reasons, Applicant respectfully submits that Europe ‘740 falls short of the requirements of these claims. Applicant therefore submits that all of the claims in this case are therefore novel over that reference also.

Applicant further submits that the claims in this case are not only novel, but are patentably distinct over the prior art in this case. In particular, as clearly described in the specification,<sup>38</sup> this invention provides the important advantages of a single monolayer that is very regular, and hydrophobic, such that water is prevented from adhering to the small surface. Intermolecular forces from this water, and also the effects of van der Waals, dipole, or capillary forces, are thus prevented from effecting very small moving elements, such as the micromachined device as a digital micromirror. These important benefits stem directly from the difference between the claims and the prior art in this case, and strongly illustrate the patentability of these claims.

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<sup>37</sup> Europe ‘740, *supra*, paragraph [0115].

<sup>38</sup> Specification, *supra*, page 11, lines 2 through 10; page 12, line 25 through page 13, line 2.

For these reasons, Applicant respectfully submits that, upon entry of this amendment, all claims in this case will be in condition for allowance. Entry of this amendment in, and reconsideration of, this application are therefore respectfully requested.

Respectfully submitted,

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